

**ABSTRACT**

The present invention relates to the use of creatine compounds including creatine, creatine phosphate or analogs of creatine, such as cyclocreatine, for treating diseases of the nervous system. Creatine compounds can be used as therapeutically effective agents against a variety of diseases of the nervous system such as diabetic and toxic neuropathies, peripheral nervous system diseases, Alzheimer's disease, Parkinson's disease, stroke, Huntington's disease, amyotrophic lateral sclerosis, motor neuron disease, traumatic nerve injury, multiple sclerosis, dysmyelination and demyelination disorders, and mitochondrial diseases. The creatine compounds which can be used in the present method include (1) creatine, creatine phosphate and analogs of these compounds which can act as substrates or substrate analogs for creatine kinase; (2) bisubstrate inhibitors of creatine kinase comprising covalently linked structural analogs of adenosine triphosphate (ATP) and creatine; (3) creatine analogs which can act as reversible or irreversible inhibitors of creatine kinase; and (4) N-phosphorocreatine analogs bearing non-transferable moieties which mimic the N-phosphoryl group.